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An Institutional Interpretation

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Power Utility Re-Regulation in East European and CIS Transformation Countries (1990-1999): An Institutional Interpretation

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ABSTRACT

This paper analyzes the process of power utility re-regulation in Eastern Europe and the CIS during the decade of systemic transformation (1990-1999); in particular, it explores reasons why early attempts to introduce competition-oriented reform models have not succeeded. We discuss advantages and disadvantages of various reform models from an institutional economic perspective. The approaches to and results of power sector reform in Eastern Europe are assessed; quantitative indicators are wholesale and retail prices, cost coverage ratios, investment levels, and the degree of unbundling and privatization. The paper concludes that a gradual approach to reforms may have been appropriate for the first years of systemic transformation, but that today, ten years later, there is no reason to delay market-oriented reforms any longer.

Keywords: Power sector, institutions, transition, Eastern Europe

JEL-classification: L94, P23, O17

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1. INTRODUCTION

The institutional conditions for the introduction of competition in network industries has become an issue in public policy and research in highly developed industrial countries as well as in transformation, emerging and developing countries. Institutional economics and the positive theory of regulation converge on the view that there is no such thing as the best-practice to restructure and privatize a formerly state-owned, vertically integrated monopolist, say in the power industry. In particular, the transaction costs of implementing and running different organizational models vary both with respect to the institutional endowment of a country and the technical state of its infrastructure (Bickenbach/Kumkar/Soltwedel, 1999). The interaction between institutions and public policy in different regional/national and sectoral settings has been studied in depth in the U.S. (e.g. Joskow, 1997), Western Europe (Glachant, 1998), Latin America (Spiller, 1993), and Asia (Levy/Spiller, 1996). By contrast, the East European transition countries have not yet been subject to a broad comparative analysis. Some authors argue that a reasonable case can be made for delayed liberalization in a transformation context (e.g. Armstrong/Vickers, 1996, Cowen/Cowen, 1998), whereas others consider the first moments of transformation as the window of opportunity for achieving far reaching reforms, and thus argue in favor of rapid liberalization (shock therapy). The available empirical literature, such as Newberry (1994), Stern/Davis (1998), Kennedy (1999) and European Bank for Reconstruction and Development (2000) reports evidence on the difficulties of restructuring and privatizing electric utilities in Eastern Europe, but it fails to explain why progress has been relatively slow thus far.

This paper provides an institutional interpretation of power sector re-regulation in Eastern Europe and the CIS during the decade of systemic transformation. The hypothesis that we pursue in this paper is that given the radical systemic and institutional change in Eastern Europe and the worn-out state of the post-socialist infrastructure, it may not have been possible to implement "best-practice" Western reform models in Eastern Europe. Given the difficulties of quantitative tests for regulatory reform in Eastern European transformation countries, we shall apply a comparative institutional approach. The paper is structured in the following way: Section two discusses the options for regulatory reform in the power sector; Section three identifies the specific conditions of power sector reform in post-socialist transformation countries, both institutional and technical. Section four presents a survey of power sector reform in Eastern Europe, appended by three country case studies (Poland, Hungary, and Ukraine). Section five concludes that a stepwise introduction of competition may be more conducive to an efficient outcome than immediate reforms; however, ten years into the transformation process, there is no reason to delay the next reform steps any longer.

2. OPTIONS FOR REGULATORY REFORM IN THE POWER SECTOR

2.1 Models for a Competitive Power Sector

This section briefly recalls the options facing Eastern European countries desiring to reform their power sectors in the early 1990s (for surveys see Kennedy, 1999, or Kumkar, 1999). The power sector can be considered as consisting of four distinct activities:

- generation (in power plants),
- high-voltage transmission (about 110-500 kV),
- low-voltage distribution (about 0.4-30 kV),
- sales/trading.

Transmission and distribution are considered natural monopolies. The hypothesis of market-oriented regulatory reform is that by introducing competition in power generation, by liberalizing trade and by installing an efficient regulation on the remaining monopolies, total welfare can be increased. The reform models which are implemented world-wide in order to introduce competition in the power sector can be classified into four, the difference being

- the degree of vertical integration,
- which stage in the value added chain is opened for competition (generation and/or wholesale and/or retail trade), and
- the regulation of the remaining activities (i.e. transportation) and of tariffs.

The following description of the reform models takes as reference the status quo ante prevailing both in Eastern Europe and in continental Western Europe, i.e. vertically integrated monopolist subject to some rate-of-return regulation, often owned by the state (see Kumkar, 1999, 14 sq.):[2]

a) In the single buyer model, competition is introduced only in generation, via negotiations between the single buyer and the independent power generators or importers. The single-buyer is a monopsonist upstream, and a monopolist downstream;

b) the pool model allows competition in generation and retail trade. Wholesale trade is organized by a pool which becomes a re-regulated monopoly (such as in the English/Welsh model). The pool dispatches plant on the basis of a merit order (supply) and the forecast demand; it charges a (monopoly) fee for transmission, service, and capacity. All stages of the value added chain are vertically disintegrated and organized within separate companies. If one assumes full information and a benevolent regulator, the pool model yields a welfare optimizing price mechanism;

c) the model of Third Party Access abolishes the wholesale trade monopoly and allows competition in generation, wholesale and retail trade. Access to the transportation and distribution

[2] Note that none of these models exists in reality in its pure form described below. Within the European Union (15 member states), there are no less than six distinct modes of regulation; with further

lines may be negotiated or regulated. Disintegration may be structural (full unbundling), or formal (accounting unbundling only, which implies the danger of transfer pricing);

d) the common carrier model (also: general access model, market model) is the most liberalized model. In its pure form, competition prevails at all levels, only transportation remains a regulated monopoly. Commercial and physical transactions are separated; traders play the most important role for optimizing capacity use.

2.2 A transaction cost-based comparison between regulatory models

The last 15 years have witnessed a vivid debate upon the efficiency of different models of power sector deregulation (for a recent survey, Kumkar, 2000). Traditional competition theorists had argued that structural vertical disintegration was necessary to yield optimal results from liberalization.[3] By contrast, new approaches in microeconomic theory insist on the importance of information asymmetries in the definition of a regulatory model. Therefore, the dangers of collusion and double marginalization that deregulation may bring about in the absence of efficient regulation have to be addressed.[4] The new institutional economics argues that there is no simple solution to the conflict of interest that the regulator has between creating conditions for socially optimal private investment (and thus assuring a stable and efficient supply and safeguarding investments), while at the same time forcing the monopolist to pass a maximum of his rent on to the consumers. The hold-up problem, where the regulator expropriates the quasi-rent from the private investor once the latter has sunk his investment, is particularly acute in a context where institutional structures are unstable, political strategies are short-term and external sanctions (such as reputation losses for an unstable regulator) are not well established.[5]

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liberalization, the variety of industry structures is likely to increase (source: Eurelectric; for an institutional interpretation see Glachant (1998).

[3] Cf. Gröner, H. (1965: Ordnungspolitik in der Elektrizitätswirtschaft. ORDO, pp. 333-412).

[4] Thus, Meran/Schwarze (1998) have shown that if the natural monopolist, the system operator, can not be forced to an efficient supply of its transport capacity, then "vertical disintegration with competition of power supply and reregulation of the power distribution does not beat the old fashioned system of vertically integrated electricity supply under regulation." (p. 279). The reason is that by structurally separating transmission from generation and distribution, the efficient supply of energy within the vertically integrated firm is no longer assured, which leads to lower quantities supplied to the final consumer at higher prices. Borenstein, Severin, and James Bushnell (1999: An Empirical Analysis of the Potential for Market Power in California's Electricity Industry. Journal of Industrial Economics, Vol. 17, No. 3, 285-323) have identified an inverse relation between the market power of players and the prices in a dynamic model; Kreuzberg, Martin, Riechmann, Christoph (1999: Deregulation and Regulation in the European Power Market. DIW-Vierteljahreshefte zur Wirtschaftsforschung, Quarterly Journal of Economics, Vol. 68, No. 4, 566-578) arrive at a similar conclusion in a static concentration analysis.

[5] Spiller (1993, p. 393) even argues that in a context characterized by political instability, weak judiciary and regulatory institutions, and slow economic growth, state ownership of utilities and state investment may be (socially inefficient) default responses, as no private investor is accepting the risk of expropriation (adverse selection).

In transformation countries, or other emerging and developing economies, there is no such thing as a well functioning judicial system respecting property rights and contracts. "Independent" regulatory agencies are neither conceivable nor even desirable in countries where this independence might either be curtailed over night, or be misused for other purposes (such as the individual enrichment of the chief regulator). Neither can the regulator be expected to invest in reputation building if his time horizon is short. We therefore propose to move away from the traditional welfare-oriented debate of 'first-best' models, and concentrate on the transaction costs of different reform models in a transformation or developing context. These transaction costs[6] can be related to (Kumkar, 1999, pp. 134 sq.)

- safeguarding specific investments,
- defining optimal price structures,
- regulating the market for differences (a natural monopoly of the system operator), and
- developing competing institutions of trading.

The difference between Eastern European power sectors and developed market economies lies mainly in the large investments that the former require for upgrading their worn-out equipment to international standards.[7] We shall therefore concentrate on the first aspect, safeguarding of investments. Bickenbach et al. (1999, pp. 34 sq.) propose two types of criteria with regard to which the transaction costs of safeguarding in the different models can be compared: technical ones (market size, state of the transmission network) and institutional ones:

- the market size is the amount of final electricity consumption for which there is competition between different suppliers (i.e. the uncaptured clients). The market size determines the extent to which real competition can be expected after deregulation. If the market is small, collusion between producers is likely. The market size also impacts the discretionary power of the regulator: if the market is small, there will be less external usage of the grid (TPA), which complicates the standardization of access conditions and increases the risk of discrimination;
- the density of the transmission networks also determines the maximal level of competition between regions and the degree of discretionary regulatory power. Only as long as a dense, redundant network is available can different power plants really be put in competition without reducing system security.[8] An underdeveloped network also increases the heterogeneity of TPA,

[6] Kumkar (1999, p. 51) defines transaction costs in a pragmatic way as the difference between total costs of supply (including the cost of regulation) and the minimal production costs in the (hypothetical) "first best" case; an optimal regulation model is one with regard to which no superior model, i.e. implying lower transaction costs, can be defined.

[7] The investment needs of the Eastern European power sector were estimated at several tens of bn. USD by the European Commission.

[8] The quantification of the network density is also technically difficult, as it not only includes the structure and capacity of the network itself, but also of the associated metering and communication system (which in most Eastern European countries was not highly developed).

implying a complication of the regulation of the grid company, but also a lower degree of controllability of the regulator himself (Kumkar, 1999, p. 71).

Other things being equal, the transaction costs to safeguard specific investments are inversely related to the market size and the network density. In a small market with low network density, the single buyer model minimizes transaction costs, and they are highest in a common carrier model, as all possible complications of trade relations have to be integrated in the contracts. With increasing markets size and network density, the relation is inverted: the common-carrier model features the lowest transaction costs of safeguarding in a large market without technical constraints (Table 1, upper part).

On the other hand, the stability of the institutional environment also has an impact on the transaction costs. In an unstable institutional environment, transaction costs depend crucially upon the discretion of the regulator: the wider the competencies and the fields of action of the regulator and the degree of vertical integration of the power sector, the higher the regulatory risk. Thus, in the absence of institutional checks and balances, a policy limiting the scope of activity of the regulator is a measure of reducing the regulatory risk. In this respect, the common carrier model has the lowest transaction costs; by contrast, the single-buyer model is most exposed to regulatory risk, due to the breadth of regulated activities and the high degree of vertical integration (Table 1, lower part).[9]

The institutional interpretation of reform models implies that the chance of succeeding the introduction of competition into the power sector is positively related to the existence of a considerable market size, the availability of sufficient network capacity (grid and distribution net) and the stability of the institutional framework (reliable politics, independent judiciary, economic growth, etc.). When applied to Eastern Europe, it reveals a paradox: given low market sizes and technically underdeveloped networks in some countries of Eastern Europe, the approach would suggest the application of a single-buyer model; on the other hand, given substantial institutional instability and regulatory risk, a common-carrier model seems to be suited best.

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[9] Bickenbach et al. (1999, p. 34) draw concrete conclusions on the appropriateness of different regulatory regimes:

- effective competition between power generators requires a sufficiently large market and a quantitatively and qualitatively developed transmission network;
- the single-buyer model seems adequate for countries with a low developed, relatively small power sector;
- the common-carrier model is suited for large, highly-developed industries, but also in an unstable regulatory framework;
- the advantages of these two "extreme" forms (single-buyer and common-carriage) are related to the transaction costs of securing specific investments in generation and distribution against the hold-up problem, and the administrative costs of regulating access prices;
- the Pool-model and the (regulated or negotiated) access are suited as intermediate solutions (on the way to common-carriage) in growing economies; in medium-sized, less dynamic power sectors they can be the ultimate solution by themselves.

The discussion shows that if one takes the transaction-cost approach serious, it is not possible to prescribe a first-best regulatory model, independent of institutional and technical specifics. In the next two sections we shed some light on the specifics of power sector reform in Eastern European transformation countries in order to evaluate power sector reform in this region.

Model Specification	a) Single Buyer	b) Pool	c) Third Party Access	d) Common carrier
	Transaction costs of safeguarding specific investments			
low market size, low network density	+	0	0	-
medium market size, medium network density	0	0	+	-
large market size, high network density	-	0	0	+
	Transaction costs related to the institutional environment			
high stability of the institutional environment	0	0	0	0
low stability of the institutional environment	-	0	0	+
+ = low transaction costs 0 = medium transaction costs (or undefined) - = high transaction costs				

Source: based on Kumkar (1999, 141)

Table 1: Comparative evaluation of reform models with respect to transaction costs

3. SPECIAL CONDITIONS OF POWER SECTOR REFORM IN EASTERN EUROPE

3.1 The institutional aspects

The restructuring of power industries in Eastern Europe and the Soviet Union took place within a process of radical political, institutional and economic change. An entire sub-continent, including one former superpower, had decided to abandon the state planning system and to replace it by something else, tentatively a market economy. The transformation required the introduction of law as a stable system of legally and judicially protected entitlements, in contrast to temporary and volatile governmental commands; moreover, it needed the institutionalization of an economic constitution, providing incentives for individuals to set up independent, profit-oriented enterprises in a monetized environment (see for details Hirschhausen/Waelde, forthcoming). The implications of system transformation on power sector restructuring can be traced at three different levels:

i) The formal institutions required for reforming the energy sector were largely missing in the first years of transformation, just as they were for the rest of economic activity. These include the legal framework and the technical prerequisites to operate and control markets, and budget

constraints on independently operating enterprises (for example, bankruptcy procedures, banking and financial sector regulation, social security); [10]

ii) the reform of the informal institutions could not be decreed by law, but it had to emerge "from below", though to a certain extent driven by external economic constraints, mainly relative prices. Concerning energy, an important informal institution in the post-socialist context was the idea of energy, in particular electricity, being a basic "human right", a heritage of socialist times and the strong ideological role of electricity therein. More than in other countries of the world energy sector reform was a sensitive issue, in particular the necessary price increases;[11]

iii) at a technical level power sector reform in Eastern Europe required the transformation of a system shaped by socialist equipment and standards, into one consistent with international leading-edge technology and standards prevailing in next door Western Europe (e.g. security, frequency stabilization, metering and communication equipment).

3.2 Technical parameters

In the early 1990s, the former socialist countries disposed of a quantitatively developed power sector with serious qualitative insufficiencies (security standards, environmental pollution, etc.). Table 2 summarizes the main technical characteristics of the Central and Eastern European EU-accession countries and the largest CIS-countries (Russia and Ukraine). The following aspects merit attention:

- The power industry in the Central and Eastern European transformation countries was relatively small, only Russia and Ukraine featured a “large” power sector. In all former socialist countries, specific electricity consumption (kWh/USD GDP) had been among the highest in the world. Capacity utilization was below international standards.
- The network density was relatively high; however, the technical state of the network was bad (problems of system security, frequency stabilization, insufficient measuring and communication equipment); this limited the extent to which competitive trading could take place.
- The unexpected drop of aggregate economic production (GDP) lead to a sharp drop of electricity consumption throughout the transformation countries, and particularly in the Republics of the former Soviet Union (Russia: -30%, Lithuania: -45%, see Table 2).

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[10] For example, it took until the late 1990s for most transformation countries to vote new energy laws (Poland: 1997, Estonia: 1998, Russia: 1998, the only exception being Hungary, 1994). Waelde/Gunderson (1996) argue that the lack of s strict formal framework in transformation countries should not be overcome by copying foreign law, but by a domestically-dominated ‘transaction-driven legislation’, creating interim law around individual real-time transactions. Quantitative indicators for the development of formal institutions are published in the annual EBRD Transition Report, London.

[11] Remember Lenin’s leitmotiv: Communism = Soviet power + electrification; quantitative indicators for the informal institutions do not exist. Proxies include the payment discipline, the corruption index, and the share of barter transactions (see Voigt/Engerer, 2000).

- The share of nuclear power was small, but had risen significantly during the last decade of socialism. Today, Eastern Europe, Russia, and Ukraine are the only European countries that are constructing new nuclear power plants, with a projected increase of capacity from the present 49 GW to 59 GW (Kreibig/Opitz/Hirschhausen, 2001). This implies an even higher political sensitivity of power sector reform.
- A further constraint on restructuring was the collapse of domestic primary energy production (hard coal, lignite, peat, wood, oil shale, etc.), and the high dependence upon formerly subsidized oil and gas deliveries from Russia.[12] In some countries, power sector restructuring was linked to the restructuring of the upstream coal industry (Poland, Czech Republic, Hungary, Ukraine), in part through forced vertical integration. Thus, short-term political constraints limited the scope of reform options.

[12] One factor dampening the need for foreign investment was the self reliance on basic power plant and transmission technology. Contrary to telecommunications and information technology, almost all Eastern European countries were able to rebuild their respective power sectors with domestic resources.

	Poland	Czech Republic	Hungary	Slovak Republic	Slovenia	Estonia	Lithuania	Latvia	Romania	Bulgaria	Russia	Ukraine
Net electricity generation (TWh)[1)]	130.3	60.3	34.3	20.0	13.2	8.7	15.6	4.8	52.5	38.4	771.9	157.9
Electricity import (TWh)	4.6	8.4	3.9	5.0	0.5	0.1	0.3	0.8	1.2	1.8	5.8	4.1
Electricity export (TWh)	8.1	10.8	3.3	2.5	2.1	0.7	4.2	0.3	0.5	2.0	21.0	7.0
Net electricity consumption (TWh)[2)]	111.5	52.9	30.1	21.1	10.7	7.6	7.8	4.9	49.6	35.5	702.7	144.0
Population (Mill.)	38.7	10.3	10.1	5.4	1.9	1.4	3.6	2.7	22.6	8.6	146.5	50.5
Consumption per capita (kWh per capita)	3470	1954	3359	3915	1777	5315	4615	5510	2195	4128	4795	2851
Electricity consumption/GDP (kWh/USD[3)])	1.427	2.001	0.852	1.739	0.415	1.225	1.278	0.704	1.647	2.426	2.006	2.262
Year of lowest net electricity consumption since 1990	1992	1993	1994	1993	1993	1993	1994	1995	1994	1994	1998	1997
Drop of consumption in relation to 1990 (in %)	- 9	-10	-12	-10	- 10	-33	-40	- 45	-25	-20	-30	-33
Installed Capacity (GW)	29.9	13.9	7.9	8.3	2.5	2.7	6.3	2.1	22.6	12.1	205.6	55.3
of which:												
Thermal Electric Power	27.9	11.3	6.2	3.3	1.1	2.7	2.6	0.6	16.1	1.4	140.5	36.7
Nuclear Electricity	0.0	1.8	1.8	2.6	0.7	0.0	3.0	-	0.6	3.5	21.2	13.9
Hydroelectricity	2.0	0.9	0.0	2.4	0.7	0.0	0.7	1.5	5.9	7.1	43.9	4.7
International grid connection	UCTE	UCTE	UCTE	UCTE	UCTE	UES	UES	UES	-	-	UES	UES

[1)] Net electricity generation equals generation minus own use. – [2)] Net electricity consumption equals generation plus imports minus exports and minus distribution losses. –- [3)] GDP in constant 1990 prices. – [4)] Poland, Czech Republic, Hungary and Slovak Republic are connected in CENTREL and associate members of UCTE. UES: Unified Energy System.

Sources: EIA; OECD/IEA: Electricity Information 2000, Paris, 2000; OECD/IEA: Energy Balances of Non-OECD Countries 1996-1997, Paris, 1999; OECD/IEA: Energy Statistics and Balances of Non-OECD Countries, Paris, various issues; OECD/IEA: Electricity in European Economies in Transition, Paris, 1994; Lietuvos Energija.

Table 2: Basic technical data of Central/Eastern European and CIS-power sectors

3.3 Supply of and demand for competition-oriented regulation

An important element of the institutional approach is the identification of interest groups and political bargaining, as modeled by the new political economy approach.[13] Competition-oriented regulation is supplied by individuals or interest groups within the bureaucracy (government); the shape of the 'supply curve' (marginal costs) depends upon economic costs (capital, labor, equipment, information, know-how, etc.) and political costs; the latter are the bureaucracy's (opportunity) costs of not having pursued other activities to obtain bureaucratic power, votes, etc. Positive (or: negative) demand for competition-oriented re-regulation of infrastructure in transformation countries is expressed mainly by those interest groups expecting to win (or lose) from these measures. The demand for competition-oriented regulation was negative for the state-

[13] This section picks up ideas developed in Stern (1994) and Hirschhausen/Engerer (1998).

owned infrastructure companies and some of the consumers. Other governmental departments and investors may have had a positive willingness to pay for some deregulation, but beyond a certain level, their aggregate willingness turned negative. The only interest group to have a positive willingness to pay for all states of deregulation were the International Financial Organizations.

The political market for 'competition-oriented reregulation of infrastructure' that emerged in transformation countries is stylized in Figure 1. The abscissa shows the degree of deregulation as measured, e.g. by the degree of network access, unbundling, or the X-factor in the case of price-cap regulation; the ordinate shows the marginal political costs of supply of and the willingness to pay for competition-oriented regulation, respectively. This exercise indicates that under the conditions of system transformation, the market equilibrium is likely to come about at a rather low degree of deregulation.

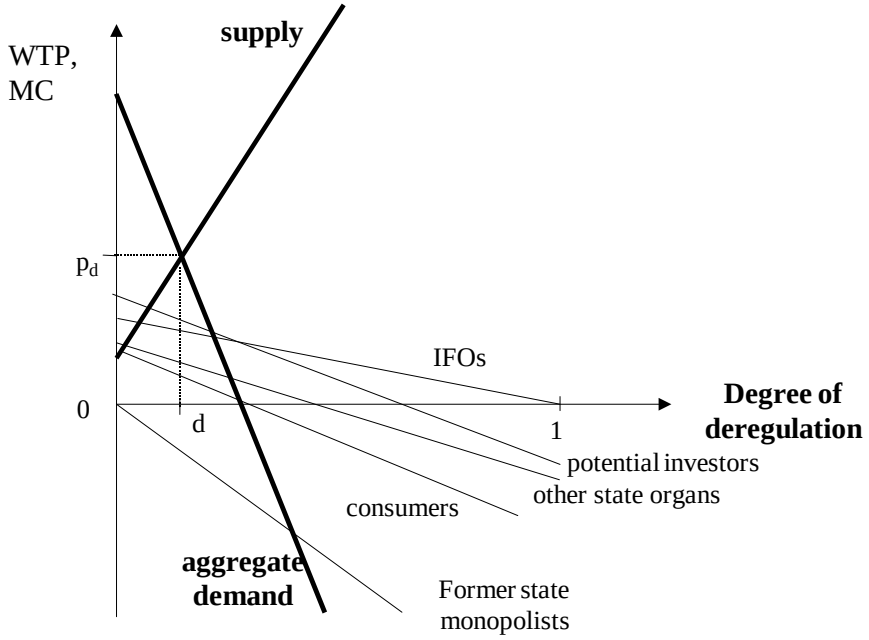


Figure 1: Stylized supply and demand on the political market for competition-oriented infrastructure policy

4. RESULTS OF POWER SECTOR REFORM IN EASTERN EUROPE: SURVEY AND COUNTRY CASE STUDIES

4.1 Survey: Little competition after a decade of "reform"

Ten years after the inception of economic transformation, and only a few years before many Central and Eastern European countries accede to the European Union, power sector reform has resulted in very little competition, in particular if compared to the ambitious reform objectives set out in the early 1990s. Indeed almost all Eastern European and CIS countries had opted for the

introduction of competition in power generation and trade, mainly based upon the pool model (Poland, the Baltic countries, Russia, Ukraine, in a first instance even Hungary). Other countries, though tending toward some form of vertical integration, had also committed themselves to competition in generation and wholesale trading (e.g. the Czech Republic, Slovakia). At the end of the decade, none of the ambitious plans of the early 1990s (to establish a competitive power sector) has materialized. Table 3 presents the main results of 10 years of power sector reform in Central/Eastern Europe and the CIS. They can be summed up as follows:

- Industry structures have not been sufficiently transformed to allow real competition. Hardly any competitive measures were introduced in power generation, where the plants sell mainly to a state-owned reseller (e.g. Hungary, Ukraine) or have for a large part remained vertically integrated for a large part (e.g. Czech Republic). None of the projects for independent power production (IPP) has materialized, which shows that market entry was prohibitively costly, and that demand did not develop as rapidly as initially expected. Regional monopolies persist in Hungary, the Czech Republic and, to a large extent, in Poland and Ukraine.
- No country has introduced regulation agencies that were willing to and capable of introducing a competition-oriented, transparent regulatory framework. Where energy regulatory bodies exist (such as in Poland, Hungary, Russia and Ukraine), they have either remained under the influence of the Branch Ministry (Economics, Trade and Industry, Energy) or have been politically marginalized (such as in Russia or Ukraine). This is an indicator that models based on a competent regulator controlled by appropriate institutional checks and balances were difficult to establish in post-socialist Eastern Europe.
- Privatization did not at all proceed as rapidly as expected. Obeying to political opportunism, the privatization of power plants was forbidden (Ukraine) or unwanted (Poland, Estonia, Czech Republic) in many countries. The privatization of the power grid was not seriously considered by any transformation country for strategic reasons.[14] Where privatization was partly carried out, it did not lead to more efficient governance structures (e.g. Russia). The major exception to this rule was Hungary, which completely privatized generation and distribution.

Table 3: Main institutional results of power sector reform in Eastern Europe and the CIS (as of late 2000)

see annex

[14] There is one exception, Kazakstan, where the privatization of the grid to a foreign company failed.

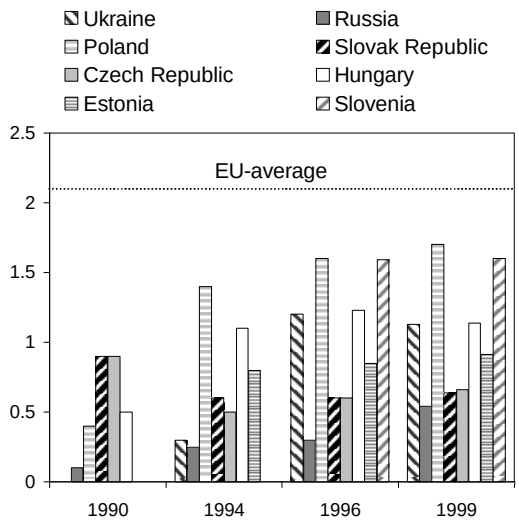
4.2 Slow price adjustment

The most evident sign that reforms have not attained their objectives is the development of absolute and relative electricity prices in the transformation countries. Price reform has been very slow. As of 1999, none of the Eastern European countries had achieved price rebalancing, i.e. the adaptation of household and industry prices according to the true cost relation (estimated between 1.8-2 in OECD and European Union countries). Figure 2 shows household to industry price ratios between 1990 and 1999: some Central/East European countries have gradually risen the cost-ratio (e.g. Poland, Slovenia), whereas others continue the cross-subsidization of household consumption through industrial consumers (e.g. Russia, Czech and Slovak Republics).

In addition, cost-coverage ratios of electricity prices remains low (Figure 3). Long-run maginal costs are attained in no country. This applies in particular to household prices, that were below 50% cost-coverage in all transformation countries. Industry prices fared somewhat better, but they, too, did not exceed 70% cost coverage.[15]

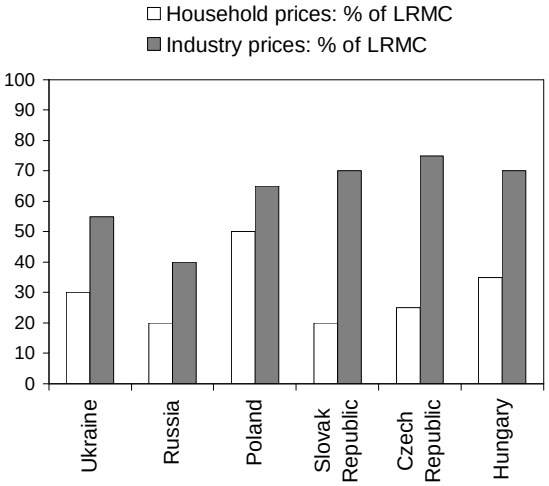
The low cost coverage can be interpreted in two ways: either prices remain subsidized directly or indirectly, which hampers the adaptation of consumer behavior to the true costs, keeps consumption artificially high and thus contributes to further distortions of long-term investment projects. On the other hand, Stern/Davis (1998, p. 444) argue that as long as monopolistic structures prevail, and given that the power plants have earned their depreciation, adapting prices to long-run marginal costs would "allow electricity companies to embark on large and potentially wasteful investment programs"; thus the policy of keeping prices low may be considered as a "state regulation by cash limits" (Stern/Davis; 1998, p. 444) which is a second best solution as long as the utilities remain state-owned. This latter argument suggests that full cost pricing should only be applied once privatization has taken place.

[15] IEA (1999, p. 116) claims that in Hungary, end-user prices for electricity have become cost-covering, but this statement is contradictory to IEA Energy Prices and Taxes (2000) data.



Sources: Stern and Davis: Economic reform of the electricity Industries of Central and Eastern Europe, in: Economic of Transition, Vol. 6 (2), 1998; OECD/IEA: Electricity Information; 2000; Eesti Energia AS; Eles Slovenija; RAO EES Rossii.

Figure 2: Cost-coverage ratios of electricity prices



Sources: Stern and Davis: Economic reform of the electricity Industries of Central and Eastern Europe, in: Economics of Transition, Vol. 6 (2), 1998; OECD/IEA: Energy Prices and Taxes, various issues, authors' calculations

Figure 3: Ratio of household to industry prices, 1990-1999

4.3 Poland: Much talk, little competition

In this section, we elaborate on the particular experience of three countries (Poland, Hungary, and Ukraine) representing quite different experiences with regard to the choice of models, the conduct of reform, and the outcome. The Polish power sector reform is an example of how an ambitious

reform project failed to be implemented, mainly due to resistance from interest groups.[16] Right from the inception of reforms, there was substantial pressure of the coal and power industry to delay the liberalization of the power sector and price rebalancing. Nonetheless, the Polish reform project was among the most ambitious of all Central/Eastern European countries. In its early phase it consisted of a combination of a British-style pool model with competitive bidding between generators, and non-discriminatory access to the grid for direct contracts between generators and large customers (above 40 GWh/a). The project also included structural unbundling of the power plants, the grid company (renamed PSE SA) and the regional distribution companies.[17]

However, the implementation of the reform project was very slow. Until 1997, when the Polish Energy Law finally came into force, the system worked according to the singly-buyer principle. The Energy Law included various measures of liberalization. An independent regulatory body was created (ERO, Energy Regulatory Office) and given substantial discretion, including wholesale and retail price regulation. In 1998, a contract market was created, whereas trading on the so-called exchange market ("stock market") started in late 2000 only. Regulated third party access to the grid (rTPA) for consumers above 40 GWh was introduced on paper in 2000. It took 10 years to implement these first significant reform steps; however, the original reform model was in fact substantially altered during this period, with the aim of avoiding the effects of competition on the power industry and upstream coal mining (see similar criticism by Kuba (1998) and Yarrow (1997)):

- There is little competition in generation or at the level of wholesale- or retail-trade. At the wholesale level, the grid company PSE continues to act de facto as a single-buyer, negotiating long-term power contracts with the generating companies, and selling it on to the 32 quasi-monopolistic regional distributors.[18] None of the three projects for independent power production has advanced thus far.

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[16] The Polish power sector is the largest in Central/Eastern Europe, including 34 larger, mainly coal-fired plants (total capacity of 32 GW) that produced almost 150 TWh in 1998 (capacity utilization below two thirds). The grid is quite developed, bottlenecks only appear in some peripheral regions (e.g. North-East). The main technical, political and economic problem is the dependence upon domestic hard coal and lignite, which are both expensive and environmentally damaging.

[17] Independent power producers were offered generous conditions for obtaining licenses: three (foreign) investors purchased licenses for independent power production: Enron in Nowa Warzyna (synchronization was initially planned for late 1999), Eurogas/National Power International in Zielona Gora (gas) and a third (unnamed) company in Belchatow (coal).

[18] Trading on the stock market remains marginal (average trading volume in October 2000: 3,500 MWh). In 1999, two thirds of electricity were managed by PSE; only few direct contracts were struck between generators and large customers, mainly state-owned companies. This modification of the initial project was justified with the necessity of keeping the coal-burning power plants in the market in order to cushion the drop of demand for domestic coal.

- Privatization has proceeded very slowly. As of late 2000, among the 34 power plants to be privatized, only eight had been sold to a new owner, most of them only partially.[19] Only one of the 32 regional distribution companies was sold to a foreign investor (Warsaw, sold to the Swedish Vattenfall). The grid company PSE, projected to be 49%-privatized, has remained in 100% public ownership.
- The Energy Regulatory Office did not develop into an independent agent and has remained under government influence thus far.
- Though relative prices were rebalanced (1999 household over industry prices: 1.6), the absolute price level remains well below long-run marginal costs.[20]

Delayed liberalization does not seem to have favored private investment, nor is there any evidence that the sale prices of public generation and distribution companies have benefited. The state continues to dominate the Polish power sector as the supplier of inputs (coal), the dominant generator, the grid company and the final distributor.[21] The development can only be explained by the broad coalition of anti-reforming interest groups (coal mining, state-owned power industry, parts of the government, large parts of the public opinion); in essence, the political costs of pursuing a competition-oriented reform were to high, given the low political yield.

4.4 Hungary: Privatization and investment rather than competition

The restructuring of the power sector in Hungary is an intriguing case of a deliberate decision against competition, and in favor of a rapid modernization of the sector, largely financed by foreign investment.[22] In the early days of reform, Hungary claimed to follow a British-style reform model designed in close cooperation with British and US consultants (Newberry, 1994 pp. 298/299). However, after resistance from the management of MVMT, the government decided to keep the sector in its former quasi-monopolistic structures, and to give priority to private foreign investment as the driving force of modernization. The Electricity Act of 1994, the first of its kind in Eastern Europe, left the choice of the reform model open, so that the subsequent governments

[19] CHP-Krakow: 55% to EdF; the PAK-complex (Patnow-Adamow-Konin) to Polish Elektrim, furthermore power plants Bedzin, Bialystok, Warsaw, Wroclaw, Gdansk and Zielona Gora.

[20] Long-run marginal costs are estimated at 5 UScents/kWh for industrial customers and 10 UScents/kWh for households (Stern/Davis, 1998, 442). Reichel, Markus, J. Malko, and D. Woiciechowski (1998: Deregulation of the Electricity Market and its Influence on Local Energy Markets- The Example of Poland. Paper presented at the 4th European IAEE Conference, Berlin, September) report average production costs of 0,039 Pf/kWh (about 1.8 UScents/kWh) for lignite, and 0,057 Pf/kWh (about 2.5 UScents/kWh) for hard coal, which is rather on the high side.

[21] Some argue that the obstacles to the Polish power sector reform are due to an overly ambitious reform approach. This hypothesis can be rejected on the grounds that the technical conditions favored a competition-oriented model (34 quasi-independent power plants).

[22] Hungary is a country with a small power sector, with only 7 GW installed capacity, one dominant nuclear power plant (Pak, 1,840 MW, 40% of generation capacity), and only 8 medium-sized power plants. In socialist times, the state-holding company MVMT (Magyar Villamos Müvek Tröszt) was organized in 11 generating plants, six regional distributors and a grid company.

were free to install a single-buyer model. A state Energy Office was established, which was responsible for issuing licenses for respective business activity in the power sector, for construction of power plants, safety issues and for negotiating electricity tariffs. Once the formal regulatory structure was set up, the government proceeded quickly with the privatization of generation and distribution. Investors were offered a generous rate-of-return regulation (on average: 8%), they had to commit to significant investments in the modernization of capacities in generation, transmission lines, and distribution. Table 4 shows the ownership structure of the Hungarian electricity supply industry as of 1998, the predominance of large Western European utilities is evident.[23]

The Hungarian approach has been criticized for its conservatism (e.g. IEA, 1999, p. 123). MVM, the corporatized state company (Hungarian Electricity Companies, Ltd.), is de facto a vertically integrated supplier.[24] Foreign investors that have acquired stakes in generation and distribution are de facto vertically integrated as well (as long as they keep good relations with the grid company MVM). Transmission prices are not clearly established, neither are non-discriminatory grid access rules defined as a precondition for competition. However, it can be argued that given substantial regulatory risk in the early phase of transformation (first half of the 1990s), the Hungarian approach was perhaps a second-best solution to attract investment to the sector and quickly approach European technical standards. The synchronization of the CENTREL-grid with the Western European UCPTE-grid was assured in Hungary before schedule (1995). Contrary to Poland, the Hungarian electricity industry is now able to participate in European competition on a level playing field. Figure 4 shows the structure of the Hungarian electricity sector as of 1999.[25]

The second aspect of the Hungarian story is the stabilization of the regulatory environment in the second half of the 1990s, leading to a reduction of regulatory risk. Regulation has proven to be reliable: the Hungarian Energy Office has taken a strong stand on the RoR-regulation, withstanding pressure of foreign investors to increase generation capacity and to overcapitalize.[26]

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[23] Between 1994 and 1996, almost USD 3 bn. were received for selling majority stakes in 7 (of the 8) large power plants, all six regional power suppliers and six regional gas supply companies. The Hungarian state, represented by the State Privatization Holding Company, retained a golden share in all of them, giving it control over mergers and acquisitions.

[24] MVM continues to operate the grid and to act as the single-buyer, it also holds stakes in generation, and also in some distribution companies; export and import activities remain exclusively with MVM as well. Large final consumers can conclude so-called individual public utility contracts with a distribution company; these contracts are freely negotiated without price control.

[25] The different shadings represent the ownership of large companies (MVM, RWE and other investors) that are fully (MVM) or de facto (RWE, etc.) vertically integrated.

[26] Thus, in 1997, the Hungarian Energy Office it forced the industry to accept a lower increase of prices than planned, on the grounds that capital expenditures had risen less than expected. In 1998 it recalled a license sold to RWE for the construction of the Bukrabany power plant and won the subsequent process in court. Hungary was able to avoid investment ruins that developed in East Germany under a similar regulatory regime, but with heavy subsidies by the government and without a binding commitment to liberalization.

The Hungarian government has made a binding commitment to market opening according to the EU-Power Directive. All investment contracts include a clause according to which a 15% market opening will be introduced in 2001 with further increases of freely tradable electricity thereafter. Given a small market and an increasingly stable institutional framework, the single-buyer model may have been conducive to rapid modernization of the sector, and privatization.

	Foreign ownership		Hungarian ownership
Elmü	75.6 %	- RWE: 50.6 % - EnBW: 25.0 %	24.4 %
Edasz	51.2 %	- EdF: 27.4 % - Bayernwerke: 23.8 %	
Titasz	74.9 %	Isar-Amperwerke	25.1 %
Emàsz	71.4 %	- RWE: 50.0 % - EnBW: 21.4 %	28.6 %
Dédàsz	75.0 %	Bayernwerke	25.0 %
Démàsz	50.0 %	EdF	50.0 %

Source: OECD/IEA: Energy Policies of Hungary, 1990 Review, Paris, 1999.

Table 4: Ownership structure of the Hungarian electricity supply industry (1998)

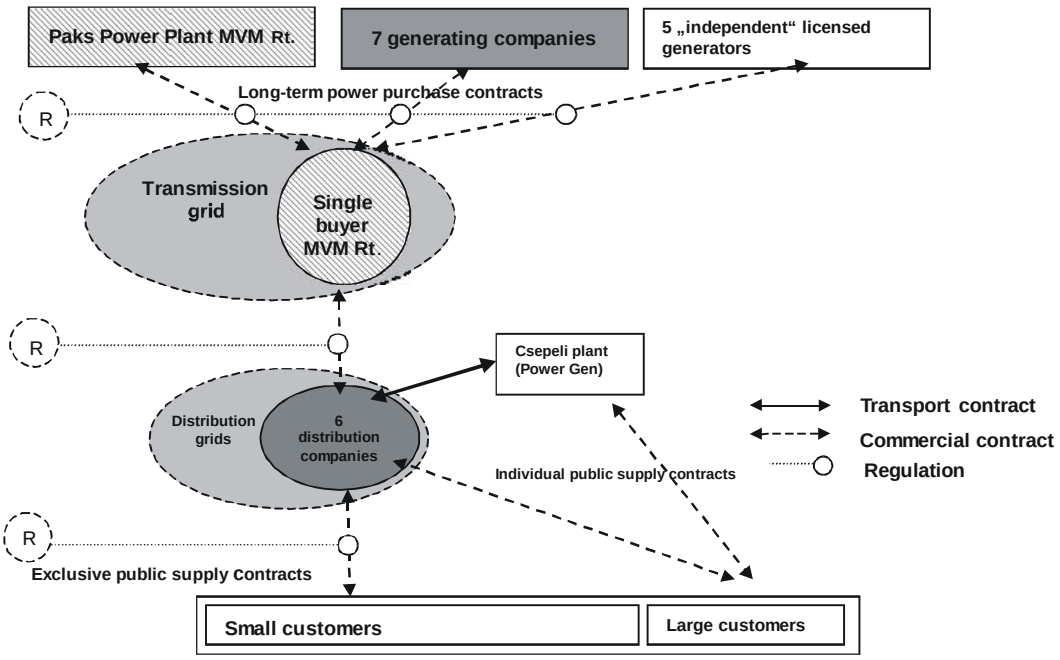

Figure 4: Structure of the Hungarian electricity sector: Single-buyer model (1999)

4.5 Ukraine: Institutional obstacles to a competitive pool-system

The Ukrainian power system was designed as an integral part of the Unified Energy System (UES) of the Soviet Union.[27] In 1994, inspired by the advice of the World Bank, the Ukrainian government decided to implement a competitive pool model (Ryding, 1998). The model included the separation of production, transmission and distribution and the introduction of competition between producers through the creation of a pool.[28] A National Energy Regulation Commission (NERC), officially an independent organization, and a pool-organization (Energorynok, part of the Ministry of Energy) were established. On paper, the regulatory framework looked indeed more advanced than the UK-model, with at least four production associations and potentially additional independent producers competing with each other, against a duopoly in the UK. Formally, the wholesale market started to operate in April 1996.[29] Privatization was not part of the reform package.

In practice the pool system did never function and the Ukrainian power sector was often close to collapse during the subsequent years. Prices were not fixed by the market but by the National Energy Regulatory Agency. A quota system for state consumers was maintained, obliging regional distributors to supply mainly communal consumers at low prices. The regulator was controlled politically by the Energy Ministry. Unpaid bills of the customers resulted in a lack of payment to the Pool and finally in non-payment to the generators which became unable to pay for their inputs, most of all for fuel; payments to Oblenergos rarely exceeded 40%.[30] Independent traders developed and started to arrange complex barter-chains in order to solve the fuel problems and to settle payment on the basis on give-and-take contracts. Transaction costs rose and prices became intransparent. System frequency became unstable (down to 49.7 Hz on some days), and users had to be cut off temporarily for security reasons in the nuclear power plants.

The main reason for the failure of the Ukrainian power sector reform must be sought in the specific post-Soviet institutional situation that the country faced from 1992 onwards, in particular

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[27] Total installed generating capacity amounts to about 55 GW. After a sharp decline of generation from 279 TWh in 1991 to about 172 TWh in 1998, electricity production and consumption seem to have stabilized. Thus, notwithstanding the fact that some of the plants are inoperable, there are large overcapacities (estimated at 12-15 GW, about 25% of capacity). Taking into account a considerable potential to reduce electricity intensity of GDP there will still be overcapacities even if economic growth will resume.

[28] The eight vertically integrated regional utilities were split up in 1993 and transformed into 7 generation companies (one for nuclear power, two for hydropower and the remaining four for thermal power (in the four regions of the country: Center, West, South, East)), and 27 regional supply companies ("Oblenergos").

[29] The pool's purchasing and selling prices were regulated on a cost plus basis by the NERC. Only thermal power plants were allowed to bid into the pool; selling prices differed for every region. In addition prices for the final customers and transport tariffs were also defined by the NERC, cross subsidization between different final consumer groups in favor of private households was still not abolished.

[30] Source: Ministry of Energy.

the low monetization of the economy, and the inconsistency (or rather: absence) of a legal basis and a rule of law. Ukraine was basically a barter-economy. Neither a legal framework nor law enforcement were developed to settle the conflicts of interest.[31] During 1992-99, no private investment took place. The most basic market rules (fulfillment of contracts) did not work. In addition, the absence of an adequate metering and communication system able to control and bill inflows and outflows of the grid implied the impossibility to introduce user-specific prices. The case of Ukraine shows the importance of the institutional environment upon the outcome of power sector reform. It may be argued that the short-sighted implementation of an overly ambitious reform project has prevented a gradual, long-term recovery of the industry.

Having surveyed power sector reform in the transformation countries, it may be asked whether delayed reform has rendered the restructuring process more sustainable, as some theoretical approaches had implied. Yet we see no indication that transformation countries delayed reform deliberately with a specific objective in mind (e.g. to spur private investment). Instead, it seems that competition-oriented reform was resisted by influential interest groups rather than held back by farseeing regulators. Kocenda/Cabelka (1999), Kuba (1998), Opitz (2000), Yarrow (1997), IEA (1996) converge in reporting evidence on the dominant role of incumbent monopolists, the liability of an ailing coal industry, and the request for monopolistic protection made by foreign investors. Whether this conservative policy has spurred investment can be doubted: except for Hungary, none of the Eastern European power sectors has received significant amounts of private investment.

5. CONCLUSIONS

This paper assesses a decade of power sector reform in Eastern Europe. The available evidence seems to contradict the hypothesis according to which a competition-oriented approach, e.g. the British pool model, provided the best option for Eastern European countries to follow. On theoretical grounds of the new institutional economics, no unequivocal recommendation could have been given to Eastern European countries in the early phase of systemic transformation. While the small market size and the need for a technological catch-up favored a singly-buyer model, high institutional instability implied a reduction of the scope of regulation and, thus favored a common carrier model. However, neither the technical nor the institutional requirements

[31] The electricity law which, after several years of political bargaining in Parliament, was approved in 1997 lacks regulation of the contractual mechanism of the wholesale market. A law on the wholesale market was brought into Parliament in mid-2000, but has been modified regularly since. Corruption and rent seeking efforts, even within government structures, undermined the first steps of privatization (see Ryding, 1998).

for competition in the power sector were available in any transformation country in the inception phase of reform. In addition, the outcome of power sector reform was heavily influenced by the specific political economy of post-socialist transformation.

The empirical evidence also suggest an inverse relation between the scope of competition-oriented reform projects and the real outcome. Strangely, the most radical reforms in post-socialist Eastern Europe have been attempted by countries with a particularly weak institutional framework (Russia, Ukraine, Kazakhstan); it turned out, though, that post-Soviet institutional instability rendered reform impossible in these countries. The countries opting for a gradual reform approach (e.g. Hungary, Czech Republic) show no worse, and sometimes even better results than the potentially radical reformers in terms of price rebalancing, investment, and regulatory stability. The Hungarian case of a seemingly successful single-buyer model combined with rapid privatization and investment is particularly intriguing. While a non-competitive single-buyer model is not the appropriate second-best solution for all transformation countries, there is also no prior for a competition-based system in countries undergoing substantial institutional reforms.

In the second phase of transformation, roughly speaking 1996 and beyond, one observes a divergence between the state of the power sectors in Central and Eastern European candidates for EU-accession, and the post-Soviet CIS-countries. Whereas the former countries have stabilized the institutional framework and reduced regulatory risk, the latter lack clear governance structures and a political decision on what path to follow. The policy recommendations therefore have to be differentiated:

- In the reforming Central and Eastern European countries, there is no reason to delay the next reform steps any longer. Price rebalancing should be done quickly, and prices should reflect long-run marginal costs in order to give the correct price signals to consumers. Privatization of generation and distribution should now be carried out rapidly. The single-buyer model restricts competition in an unnecessary manner; the choice between the two remaining competition models, the pool or generalized network access (common carriage), does not really matter as long as regulation is transparent and pricing non-discriminatory;
- the CIS-countries and other non-reforming countries in Central/Eastern Europe (such as Romania or Bulgaria) still suffer from massive institutional instability so that rapid liberalization with stable regulation is not a feasible option. General price increases are as urgent as cost-oriented price rebalancing. Privatization of generation capacities will remain a problem and should not be constrained by artificially high capital valuations, vertical integration with coal mines or the like. Privatization of regional supply companies should only be carried out if a transparent tendering procedure is assured, eventually with assistance from International

Financial Organizations. Common carriage or a pool model should be considered as a long-term objective but market opening may proceed somewhat slower than in CEE- or EU-countries.

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Table 3: Main institutional results of power sector reform in Eastern Europe (as of late 2000)

	Poland	Hungary	Czech Republic	Slovakia	Slovenia
Market description					
Generation	35 generating comp.	8 generating comp. and 5 licensed generators	CEZ a.s. [1] (74 %) and Elektrany Opatovice a.s.	SE a.s. [2] (87 %) and some IPP	8 generating comp.
Transmission	PSE SA[3]	MVM Rt. [4]	CEZ a.s.	SE a.s.	Eles[5]
Distribution	33 distribution comp.	6 distribution comp.	8 distribution comp.	3 distribution comp.[6]	5 distribution comp.
Market model/ TPA	rTPA	single buyer model	nTPA	single buyer model	rTPA
Restructuring	unbundling and separation	separation	distribution was separated from generation and transmission	distribution was separated from generation and transmission	separation
Ownership					
Generation	state and private owned	foreign and Hungarian shareholders; municipalities; MVM Rt.	67 % state owned; some foreign shareholders	mostly state owned	state owned
Transmission	state owned	state owned	67 % state owned; some foreign shareholders	mostly state owned	state owned
Distribution	mostly state owned	mostly foreign shareholders; „golden share" by the state	46-48 % state owned; municipalities and some foreign shareholders	state owned	state owned
Liberalization					
Wholesale market	gradually since 1998 – 2006; pool-trading since June 2000;	MVM as single buyer;	gradual opening planned from 2002	gradual opening planned between 2001-2006	gradual opening planned from 2001
Retail market	2006 all customers	small: between retailers and large customers	not yet	not yet	not yet
Regulatory authority	Energy Regulatory Board: URE[7] (Council of Ministers)	Energy Regulatory Board: MEH[8]; Ministry of Economic Affairs; Hungarian Atomic Energy Authority	Energy Regulatory Board as part of the Ministry of Industry and Trade; Ministry of Finance	Ministry of Finance; Ministry of Economy; Antimonopoly Office	some Ministries; Energy Agency (plan)
Legitimization	Energy Law 1997	Electricity Act 1994	Energy Law 1995	Energy Act 1998	Energy Law 9/1999

	Estonia	Lithuania	Latvia	Bulgaria	Romania
Market description					
Generation	Eesti Energia AS	Lietuvos Energija AB; NPP Ignalina; PP Vilnius and Kaunas	Latvenergo	NEK AG[9]. some separated power plants and industrial generators	Termoelectrica; Hidro-electrica; Nuclear PP; 10 licensed power generators
Transmission	Eesti Energia AS	Lietuvos Energija AB	Latvenergo	NEK AG	Transelectrica
Distribution	5 distribution comp.	7 distribution comp. (Lietuvos Energija AB)	Latvenergo	7 distribution comp.	Electrica
Market model/ TPA	rTPA	rTPA	single buyer model	single buyer model	rTPA
Restructuring	separation	some separation		first separation steps	separation
Ownership		85 % state owned; 9.8 % foreign shareholders; 4.4 % others	no privatization is planned	state owned; privatization until 2010	state owned
Generation	private and state owned				
Transmission	state owned				
Distribution	private and state owned				
Liberalization	none; gradually as of 2003	gradually as of 2001	none	none	none
Wholesale market					
Retail market					
Regulatory authority	Energy Market Inspectorate	Energy Agency; Energy Inspectorate; National Control Commission for Energy Pricing and Energy Activity	Energy Regulation Council (Ministry of Economic Affairs)		Energy regulation Authority
Legitimization	Energy Law 1998	Energy Law 2000	Energy Law 1998	Energy and Efficiency Law 1999	2 acts from Energy-Regulatory Authority

[1] CEZ a.s.: Ceské Energeticke Zavody. – [2] SE a.s.: Slovenské elektrárne. – [3] PSE SA: Polskie Sieci Elektroenergetyczne SA. – [4] MVM Rt.: Magyar Villamos Müvek Részvenytárság. – [5] Eles: Elektro Slovenia. – [6] Západoslovenské energetické závody (ZSE); Stredoslovenské energetické závody (SSE); Vychodoslovenské energetické závody (VSE). – [7] URE: Urzad Regulacji – [8] MEH: Magyar Energia Hivatal. – [9] NEK AG: Natsionalna Elektriceska Kompania.

Sources: OECD/IEA: Electricity in European Economies in Transition, Paris, 1994; OECD/IEA: Energy Policies of Poland, Paris, 1995; OECD/IEA: Energy Policies of the Czech Republic, Paris, 1994; OECD/IEA: Energy Policies of Slovenia, Paris, 1996; OECD/IEA: Hungary 1999 Review, Paris, 1999; Kennedy, David: Competition in the power sectors of transition economies, EBRD Working paper No. 41/1999; Stern, Jon and Junior R. Davis: Economic reform of the electricity industries of the Central and Eastern Europe, in Economic in Transition, vol. 6 (2), 1998; Ministry of Economic Affairs of Slovak Republic, Energy Policy of Slovak Republic: http://www.economy.gov.sk/mh/angl2htm; Eesti Energia: Annual Report 1999; Eles: 1999 Annual Report; Lietuvos Energija AB; http://www.cire.pl; http://www.strom.de.